

Compact, Lightweight, High Voltage Propellant Isolators, Phase I

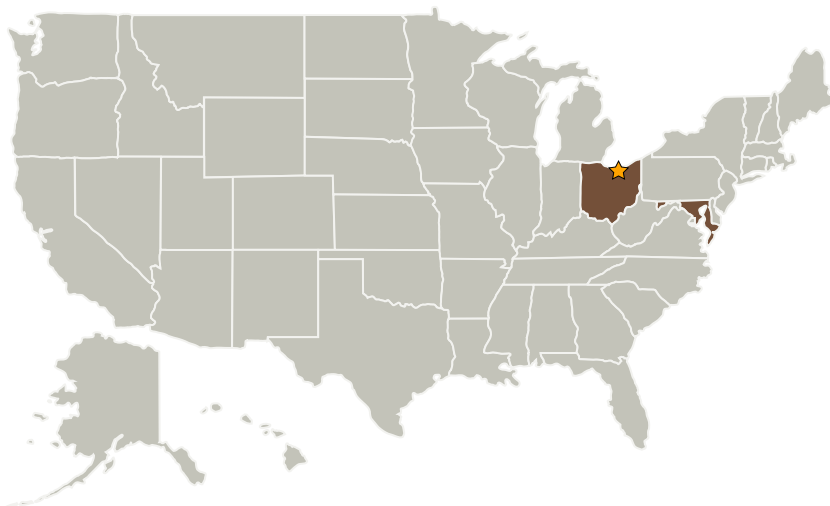
Completed Technology Project (2004 - 2004)



Project Introduction

TA&T, Inc. proposes an enabling fabrication process for high voltage isolators required in high power solar electric and nuclear electric propulsion (SEP and NEP, respectively). State-of-the-art propellant voltage isolators have sufficient performance for existing ion and Hall thruster engines with voltages of a few kilovolts. However, future high thrust, high specific impulse (Isp) engines will have to support beam voltages >10kV to meet performance requirements. If existing isolator designs are simply scaled-up for higher voltages, then a significant mass penalty is incurred. The proposed fabrication approach, known as ceramic stereolithography(CSL), is an automated, layered manufacturing process that enables net shape, monolithic ceramics with complex geometry. The process is beneficial as a rapid, low cost fabrication approach that enables exploration of novel isolator designs with complex internal flow passages. The process is also beneficial for isolator production, because it is capable of making the complex structures as a single piece ceramic, eliminating the liability associated with multi-piece construction necessary using conventional ceramic fabrication methods. The Phase I project will involve process development, device design, prototype fabrication and testing in collaboration with Aerojet Corporation (Redmond, WA).

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Technology Assessment & Transfer, Inc.	Supporting Organization	Industry Women-Owned Small Business (WOSB)	Annapolis, Maryland

Primary U.S. Work Locations

Maryland	Ohio
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Walter R Zimbeck

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.1 Power Generation and Energy Conversion
 - └ TX03.1.1 Photovoltaic